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REMARKS

Claims 1, 5, 7, 8 and 13-21 are pending, with claims 1 and 13 being independent. As a preliminary matter, it is noted that the Examiner has not rejected claims 14 and 16, thereby indicating that claims 14 and 16 contain allowable subject matter.

Claims 1, 5, 7 and 8 stand rejected under 35 U.S.C. § 103 as being unpatentable over JP '197 ("Takahashi") in view of Hongo et al. '967 ("Hongo"). Claim 1 is independent. This rejection is respectfully traversed for the following reasons.

The Examiner relies exclusively on JP '197 as allegedly disclosing all the features of claim 1 except for an inverter. In this regard, it is respectfully submitted that the Examiner merely makes conclusory statements regarding features recited in claim 1 as allegedly being disclosed by Takahashi based solely on the English Abstract thereof. The Examiner relies on Hongo as allegedly disclosing an inverter. The Examiner does not identify any specific portion of Takahashi which allegedly reads on each and every feature of the present invention. Indeed, the Abstract of Takahashi is completely silent as to the claimed features, and the Examiner does not refer to any other portion of Takahashi as allegedly being relevant to the claimed features.

When imposing a rejection under 35 U.S.C. §103, the Examiner is required to point to "page and line" wherein an applied reference is perceived to identically disclose each feature of a claimed invention. *In re Rijckaert*, 9 F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993); *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481 (Fed. Cir. 1984). In the instant case, as noted above, the Examiner merely cites broadly the English Abstract of Takahashi as disclosing everything claimed except for the inverter. The Examiner does not specifically explain how each claimed feature is being read onto the allegedly corresponding element of Takahashi, and for at least this reason, it is respectfully submitted that the pending rejections fail to establish *prima facie* obviousness.

Nonetheless, even assuming *arguendo* proper, it is respectfully submitted that the proposed combination does not disclose the claimed invention. Indeed, contrary to the Examiner's reliance thereon, Takahashi fails to disclose or suggest several features of the claimed invention.

Claim 1 recites in pertinent part, "a control unit for detecting rotational speed fluctuation of a brushless motor caused by load torque fluctuation and controlling a phase and an amplitude of a motor current of the brushless motor so as to restrict said rotational speed fluctuation via the inverter circuit." According to one aspect of the present invention, the claimed combination can make it possible for the motor controller to drive the motor with a desired power factor (*see, e.g.*, page 20, lines 5-6 in Applicants' specification).

The Examiner alleges that the stepping motor of Takahashi corresponds to the claimed brushless motor. However, as is well known in the art, a stepping motor and a brushless motor are entirely different structures. Moreover, the distinctive structural differences between a brushless motor as embodied in claim 1 and a stepping motor as disclosed by Takahashi effects further distinctions between claim 1 and Takahashi.

A stepping motor rotates in "steps" at a constant angle in response to one input pulse, and the torque fluctuates in "steps" so as to correspond to each phase of an excitation coil of a stator (bold line shown in Figures 9 and 10 of Takahashi). According to said fluctuation, the rotational speed of the stepping motor fluctuates. It follows therefore that the speed fluctuation (rotational speed) of the stepping motor is inherent to the stepping motor. In this regard, Takahashi is directed to suppressing the inherent speed fluctuation of the stepping motor as disclosed in the Abstract thereof.

In contrast, as is well known, a brushless motor can be similarly configured to a direct current electric motor. In this regard, a constant torque can be output according to a load torque. According to one aspect of the present invention, therefore, a rotational speed fluctuation of the brushless motor caused by load torque fluctuation can be detected, whereby the brushless motor can output the constant torque in response to the load torque to suppress the rotational speed fluctuation. On the other hand, as evident, a stepping motor as disclosed in Takahashi is structurally configured so as to be subject to torque fluctuation regardless of load torque thereby effecting rotational speed fluctuation.

Based on the foregoing, and contrary to the Examiner's position, a brushless motor and stepping motor are structurally and functionally distinct. Indeed, the aforementioned structural distinctions emphasis further distinctions in relation to the control circuitry for the motor. In this regard, all of the Examiner's conclusory assertions with respect to an alleged similarity in the motor and control circuitry of Takahashi and claim 1 are incorrect. Takahashi is completely unrelated to present invention. In sum, Takahashi does not disclose or suggest "a control unit for detecting rotational speed fluctuation of a ***brushless*** motor caused by load torque fluctuation and ***controlling a phase and an amplitude of a motor current*** of the brushless motor so as to ***restrict said rotational speed fluctuation*** via the inverter circuit" as embodied by claim 1.

Indeed, contrary to the Examiner's allegation, Takahashi does NOT describe a "rotational speed fluctuation caused by load torque fluctuation" let alone a structure which detects said rotational speed fluctuation. In direct contrast, as noted above, a stepping motor as used in Takahashi is structurally configured to have an "inherent speed fluctuation" (*see* Figures 9-10 of Takahashi) in which the load torque is constant. Indeed, Takahashi expressly discloses a

stepping motor 1 which includes a rotor 10 and stator 20, and further, Takahashi expressly states that the rotor 10 is coupled to a rotational load (not shown) which has a well-balanced weight (*see* bottom half of page 3 of Takahashi). Accordingly, Takahashi does not disclose or suggest "a control unit for detecting rotational speed fluctuation of a brushless motor caused by load torque fluctuation" as embodied by claim 1. That is, in the device of Takahashi, the speed fluctuation of the motor is not detected. In contrast, as expressly stated in page 4 of Takahashi, the disclosed device includes a calculating circuit 60 which reads out speed fluctuation corrected data corresponding to a ***set*** speed ***from a memory circuit 50***, so as to output a current waveform signal based on the set speed and speed fluctuation corrected data (*see also* English Abstract).

With respect to the claimed feature of "a control unit for ... controlling a phase and an amplitude of a motor current of the brushless motor so as to restrict said rotational speed fluctuation via the inverter circuit," the Examiner again alleges that the Abstract of Takahashi is relevant. This allegation of the Examiner is not understood, as the English Abstract of Takahashi is completely silent as to the aforementioned feature. Specifically, in the Abstract, Takahashi discloses only that "...current in each phase has sinusoidal waveform containing speed corrected component." As is clear from the context of the Abstract of Takahashi, however, the reference to "each phase" is not related to a current phase but an "exciting phase." In this regard, the Abstract of Takahashi is completely silent as to a phase of a motor current being controlled so as to restrict rotational speed fluctuation. Indeed, Takahashi merely discloses a configuration to effect outputting a current waveform signal of an excitation current, which is completely unrelated to *controlling* the phase of the current much less an amplitude of a motor current as embodied by claim 1.

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Claims 13, 15 and 17-21 stand rejected under 35 U.S.C. § 103 as being unpatentable over Takahashi in view of Hongo and Horst '295 ("Horst"). Claim 13 is independent. This rejection is respectfully traversed for the following reasons. As a preliminary matter, the Examiner again simply concludes that several of the claimed features are disclosed in the English Abstract of Takahashi, however, no such disclosure exists.

Claim 13 recites in pertinent part, "a control unit for controlling the rotational speed of the brushless motor by controlling the motor current of the brushless motor through the inverter circuit, wherein the control unit controls the motor current so as to restrict the rotational speed fluctuation of the brushless motor caused by load torque fluctuation and controls a current output from the a.c. power source based on the comparison between the amplitude of the motor current and the average of the motor current." Takahashi does not disclose or suggest the aforementioned features for reasons similar to those discussed above with respect to claim 1.

In addition, the Examiner admits that Takahashi does not disclose controlling the current output based on the comparison between the amplitude of the motor current and the average of the motor current. In this regard, it does not appear that Takahashi has a means by which to sense the motor current to enable using the motor current for calculations. That is, as seen in Figure 1 of Takahashi, there does not appear to be any feedback from the motor 1. Moreover, as described in the English Abstract, it appears data for the calculations is retrieved from a memory circuit 50 so that the device of Takahashi is related to *predetermined* values using a look-up table.

The Examiner relies on col. 8, line 49 – col. 9, line 2 of Horst as allegedly obviating the admitted deficiencies of Takahashi. However, the cited portion simply references a portion of a claim in the Horst patent. The alleged relevance of col. 8, line 49 – col. 9, line 2 of Horst to the present invention is not understood. Specifically, col. 8, line 49 – col. 9, line 2 of Horst does not

disclose controlling the current output based on the comparison between the amplitude of the motor current and the average of the motor current. For example, col. 8, line 49 – col. 9, line 2 merely discloses (emphasis added):

> ... current in the winding having an **amplitude** which is a function of the **average** voltage of the operating signals, the microprocessor means producing operating signals the **average voltage** of which is initially significantly higher than that of operating signals subsequently supplied to at least one of the switches for current flow to the winding to initially rapidly increase from zero to a peak value and then decrease from the peak value to a second and lesser value, the current decaying from this second value to zero when current supply to the winding ceases whereby the transition in the current profile which occurs when current flow ceases is not an abrupt transition, this non-abrupt transition reducing ringing in the motor and motor noise.

As seen above, the cited portion of Horst is completely silent as to a "control unit [which] ... ***controls a current output from the a.c. power source based on the comparison*** between the amplitude of the motor current and the average of the motor current" (emphasis added). That is, Horst does not suggest making a comparison between motor current amplitude and average motor current, much less suggest controlling current output from an AC power source based on the comparison. According to one aspect of the present invention, it can be made possible to increase a power factor of the a.c. power source (*see, e.g.,* page 26, lines 9 - 11 of Applicants' specification).

Indeed, the Examiner himself alleges that "Horst teaches ... the amplitude of the current is controlled as a function of the average **voltage**." In direct contrast, claim 13 recites in pertinent part, a "control unit [which] ... controls a current output from the a.c. power source based on the comparison between the amplitude of the motor current and the average of the motor **current**." As would be readily understood by one of ordinary skill in the art, the voltage applied to the motor is completely different from the motor current. As acknowledged by the Examiner, Horst does not disclose or suggest a comparison for the motor current. Instead, Horst

merely discloses a circuit 10 which controls the motor current as a function of the applied voltage, but does not control the current output from the a.c. power source of the motor.

Only Applicants have recognized and considered the aforementioned effects, and conceived of the novel and non-obvious combination (embodying a brushless motor) which can make it possible to realize said effects. "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 165 USPQ 494, 496 (CCPA 1970). Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as the independent claims are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also patentable. In addition, it is respectfully submitted that the dependent claims are patentable based on their own merits by adding novel and non-obvious features to the combination.

Based on the foregoing, it is respectfully submitted that all pending claims are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejections under 35 U.S.C. § 103 be withdrawn.

CONCLUSION

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

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To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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